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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,167	03/10/2004	Atsuhiko Takeuchi	Q79698	3337

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EXAMINER	
MARTIN, LAURA E	

ART UNIT	PAPER NUMBER
2853	

NOTIFICATION DATE	DELIVERY MODE
06/12/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/796,167	TAKEUCHI, ATSUHIKO	
	Examiner	Art Unit	
	LAURA E. MARTIN	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8 and 11-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-8 and 11-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 5-8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arquilevich et al. (US 20020060709) in view of Endo (US 20020085057).

Arquilevich et al. discloses the following claim limitations:

As per claims 1 and 8, Arquilevich et al. teaches a recording position correction method and apparatus for correcting position deviation in a sub-scanning direction crossing a main scanning direction of a recording position on a medium to be recorded [0019], wherein an inkjet type recording apparatus performs recording on said medium to be recorded by ejecting ink from a plurality of nozzles while allowing a recording head [0019], on which nozzle arrays comprising said plurality of nozzles provided substantially in said sub-scanning direction are arranged substantially in said main scanning direction, to perform scanning along at least one of forward and backward paths in said main scanning direction [0006], the method comprising: an ejection step of ejecting said ink from said plurality of nozzles onto said medium to be recorded [0006]; a measurement step of measuring an amount of position deviation in said sub-scanning

direction of an ink dot recorded [0019]; and a correction step correcting a recording position of an ink dot to be recorded on said medium for each of said plurality of nozzles based on said measured amount of said position deviation [0019], wherein said position deviation is measured based on two intervals in said sub-scanning direction between two pairs of loci (figure 7, element 701 and 709; [0069]) drawn by at least two nozzles of each a first nozzle array and a second nozzle array (figure 7, element 709 – different colors are different arrays) and [0070] (a full column of ink is fired to create a bar) which are not adjacent to each other in said main scanning direction among said plurality of nozzles in said measurement step so as to detect an inclination of said recording head [0067] (rotation) among said plurality of nozzle arrays in said measurement step (figure 7, element 701 – the magenta array cannot be adjacent to all of the cyan, yellow and black arrays); and a correcting unit for correcting a recording position. Arquilevich et al. also implies that two nozzles from the first nozzle array and two nozzles from the second nozzle array are located at different positions [0070] (the whole column is fired).

As per claim 3, Arquilevich et al. teaches a recording position correction method, wherein ink is further ejected from a nozzle [0006].

As per claim 5, Arquilevich et al. teaches a recording position correction method, wherein said ink is ejected while said recording head performs scanning along said forward and/or backward path(s) [0073] in said main scanning direction in said ejection step, and said recording position of said ink dot is previously shifted and corrected in said correction step [0019] based on an intermediate value between an amount of position deviation of an ink dot ejected and recorded in case said ink is ejected while

said recording head performs scanning along said forward path in said main scanning direction [0018] and an amount of position deviation of an ink dot ejected and recorded in case said ink is ejected while said recording head performs scanning along said backward path [0073].

As per claim 6, Arquilevich et al. teaches a recording position correction method, wherein said ink is ejected while said recording head performs scanning along said forward and/or backward path(s) in said main scanning direction in said ejection step [0073], and correction is performed in said correction step, wherein said recording position of an ink dot to be recorded along said forward path in said main scanning direction is previously shifted based on an amount of position deviation in case said recording head performs scanning along said forward path in said main scanning direction and said recording position of an ink dot to be recorded along said backward path in said main scanning direction is previously shifted based on an amount of position deviation in case said recording head performs scanning along said backward path in said main scanning direction [0019] and [0063].

As per claim 7, Arquilevich et al. teaches a recording position correction method wherein ink is ejected from at least one nozzle of each the first nozzle array and the second nozzle array [0006].

As per claims 13 and 14: a first interval of said at least two intervals is determined between loci drawn by a first nozzle of the first nozzle array and a first nozzle of a second nozzle array [0070] and [0072]; a second interval of said at least two intervals is determined between loci drawn by a second nozzle of a first nozzle array

and a second nozzle between the second nozzle array [0070]; [0072]; and (figure 7, element 701).

As per claim 15, Arquilevich et al. teaches a readable medium that stores a program to correct position deviation in a sub-scanning direction crossing a main scanning direction of a recording position on a medium to be recorded [0019], wherein an inkjet type recording apparatus performs recording on said medium to be recorded by ejecting ink from a plurality of nozzles while allowing a recording head [0019], on which nozzle arrays comprising said plurality of nozzles provided substantially in said sub-scanning direction are arranged substantially in said main scanning direction, to perform scanning along at least one of forward and backward paths in said main scanning direction [0006], the method comprising: an ejection step of ejecting said ink from said plurality of nozzles onto said medium to be recorded [0006]; a measurement step of measuring an amount of position deviation in said sub-scanning direction of an ink dot recorded [0019]; and a correction step correcting a recording position of an ink dot to be recorded on said medium for each of said plurality of nozzles based on said measured amount of said position deviation [0019], wherein said position deviation is measured based on two intervals in said sub-scanning direction between two pairs of loci (figure 7, element 701 and 709; [0069]) drawn by at least two nozzles of each a first nozzle array and a second nozzle array (figure 7, element 709 – different colors are different arrays) and [0070] (a full column of ink is fired to create a bar) which are not adjacent to each other in said main scanning direction among said plurality of nozzles in said measurement step so as to detect an inclination of said recording head [0067]

(rotation) among said plurality of nozzle arrays in said measurement step (figure 7, element 701 – the magenta array cannot be adjacent to all of the cyan, yellow and black arrays); a correcting unit for correcting a recording position; wherein a first interval of said at least two intervals is determined between loci drawn by a first nozzle of the first nozzle array and a first nozzle of a second nozzle array [0070] and [0072]; a second interval of said at least two intervals is determined between loci drawn by a second nozzle of a first nozzle array and a second nozzle between the second nozzle array [0070]; [0072]; and (figure 7, element 701). Arquilevich et al. also implies that two nozzles from the first nozzle array and two nozzles from the second nozzle array are located at different positions [0070] (the whole column is fired).

Arquilevich et al. does not disclose the following claim limitations:

As per claims 1 and 8, Arquilevich et al. does not explicitly teach the nozzles being located in different positions in said sub-scanning direction.

As per claim 3, Arquilevich et al. does not teach ink further ejected from a nozzle of a nozzle array among said plurality of nozzle arrays except said two nozzle arrays in said ejection step, and said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from at least one nozzle of each of said two nozzle arrays and at least one nozzle of said nozzle array except said two nozzle arrays in said correction step.

As per claim 7, Arquilevich et al. does not teach ink is ejected from at least one nozzle of each of two nozzle arrays which eject said ink of two colors respectively among said plurality of nozzle arrays as priority is given to a color of which density is highest in said ejection step, and said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from said nozzle of said two nozzle arrays in said correction step.

As per claim 12: the deviation is measured based on an ink dot recorded by at least one nozzle of each of two nozzle arrays most distanced from each other in said main scanning direction among said plurality of nozzle arrays in said measurement step.

As per claims 13 and 14: a spacing between the first and second nozzles of the first nozzle array and a spacing between the first and second nozzles of the second nozzle array are both symmetric with respect to a line perpendicular to the first nozzle array and the second nozzle array.

As per claim 15: Arquilevich et al. does not explicitly teach the nozzles being located in different positions in said sub-scanning direction and a spacing between the first and second nozzles of the first nozzle array and a spacing between the first and second nozzles of the second nozzle array are both symmetric with respect to a line perpendicular to the first nozzle array and the second nozzle array.

Endo discloses the following claim limitations:

As per claims 1 and 8, Endo teaches ink ejected from at least one nozzle of a first nozzle array and a second nozzle array which are not adjacent to each other in said main scanning direction among said plurality of nozzle arrays in said ejection step [0087] (figure 11, there are three nozzle arrays (K_D and C_D; C_L and M_D; and M_L and Y_D); said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from said nozzle of said two nozzle arrays in said correction step [0084]; and the nozzles of the first nozzle array and second nozzle array are located in different positions in said sub-scanning direction (figure 11 – multiple nozzles in each row print, thus the at least one nozzle of the first array and the at least one nozzle of the second array can be printing in different positions in the sub-scanning direction).

As per claim 3, Endo teaches said ink is further ejected from a nozzle of a nozzle array among said plurality of nozzle arrays except said two nozzle arrays in said ejection step [0104], and said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from at least one nozzle of each of said two nozzle arrays and at least one nozzle of said nozzle array except said two nozzle arrays in said correction step [0084].

As per claim 7, Endo teaches ink ejected from at least one nozzle of each of two nozzle arrays which eject said ink of two colors respectively among said plurality of nozzle arrays as priority is given to a color of which density is highest in said ejection

step (figure 11, elements 1 and 2), and said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from said nozzle of said two nozzle arrays in said correction step [0084].

As per claim 12: the deviation is measured based on an ink dot recorded by at least one nozzle of each of two nozzle arrays most distanced from each other in said main scanning direction among said plurality of nozzle arrays in said measurement step [0087] and (figure 11).

As per claims 13 and 14: a spacing between the first and second nozzles of the first nozzle array and a spacing between the first and second nozzles of the second nozzle array are both symmetric with respect to a line perpendicular to the first nozzle array and the second nozzle array (figure 3, figure 11, C_D, M_D, Y_D and K_D, C_L, M_L).

As per claim 15, Endo teaches ink ejected from at least one nozzle of a first nozzle array and a second nozzle array which are not adjacent to each other in said main scanning direction among said plurality of nozzle arrays in said ejection step [0087] (figure 11, there are three nozzle arrays (K_D and C_D; C_L and M_D; and M_L and Y_D); said recording position of said ink dot to be recorded on said material for each of said plurality of nozzles is previously shifted and corrected based on an amount of position deviation of an ink dot ejected and recorded from said nozzle of said two nozzle arrays in said correction step [0084]; the nozzles of the first nozzle array and second nozzle array are located in different positions in said sub-scanning direction (figure 11 – multiple nozzles in each row print, thus the at least one nozzle of the first array and the

at least one nozzle of the second array can be printing in different positions in the sub-scanning direction); and a spacing between the first and second nozzles of the first nozzle array and a spacing between the first and second nozzles of the second nozzle array are both symmetric with respect to a line perpendicular to the first nozzle array and the second nozzle array (figure 3, figure 11, C_D, M_D, Y_D and K_D, C_L, M_L).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the recording position correction method of Aquilevich et al. with the disclosure of Endo in order to improve image quality. It would also be obvious to modify Aquilevich et al. with Endo because the printhead structure, in which all four colors are not adjacent to each other, is well known in the art. It is also well known in the art to have a printhead comprising four or more arrays that print using a plurality of nozzles.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arquilevich et al. (US 20020060709) and Endo (US 20020085057) in further view of Yuji (JP 05-330088).

As per claim 4, Arquilevich et al. teaches a recording position correction method, wherein the ink is ejected from a plurality of nozzles [0006] and said recording position of said ink dot is previously shifted and corrected for each of said colors in said correction step [0019].

As per claim 4, Aquilevich et al. does not teach ink ejected from said plurality of nozzles in order that a color of said ink from each of said nozzle arrays is different from

one another in said ejection step, and said recording position of said ink dot is previously shifted and corrected for each of said colors in said correction step.

As per claim 4, Yuji teaches ink ejected from said plurality of nozzles in order that a color of said ink from each of said nozzle arrays is different from one another in said ejection step (figure 4, elements 1K, 1C, 1M, and 1Y; [0023-0030]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the recording position correction method of Arquilevich et al. with the disclosure of Yuji in order to more effectively correct recording position errors.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arquilevich et al. (US 20020060709) and Endo (US 20020085057, and further in view of Bruch et al. (US 20020163551).

As per claim 11, Arquilevich et al. discloses the method of claim 1.

As per claim 11, Arquilevich et al. does not disclose a correction step correcting recording timings of each of the nozzles based on the position deviation, said recording timings defining a timing at which the nozzle ejects the ink.

As per claim 11, Bruch et al. discloses a correction step correcting recording timings of each of the nozzles based on the position deviation, said recording timings defining a timing at which the nozzle ejects the ink [0017; 0121-0122].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the recording position correction method of Arquilevich et al. with the disclosure of Bruch et al. in order to more effectively correct recording position errors.

Response to Arguments

Applicant's arguments filed 2/27/08 have been fully considered but they are not persuasive.

Applicant argues that the listed prior art does not teach or suggest the claim amendments; however, the examiner disagrees, as cited above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Martin whose telephone number is (571) 272-2160. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/L. E. M./
Examiner, Art Unit 2853

Laura E. Martin

/Manish S. Shah/

Primary Examiner, Art Unit 2853